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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/686,756	10/16/2003	James Norman Barshinger	132226 (1306-35)	8695

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EXAMINER	
HANLEY, JOHN C	

ART UNIT	PAPER NUMBER
2856	

DATE MAILED: 04/28/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/686,756	BARSHINGER ET AL.	
	Examiner	Art Unit	
	John C. Hanley	2856	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,7-23,25-34 and 36-42* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,7-23,25-34 and 36-42* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The rejection of Claims 1-4 and 7-17 under the second paragraph of 35 U.S.C. 112 has been overcome by applicant's remarks. However, by applicant's remarks, the examiner now interprets the language "desirable" broadly as any F/D ratio or any depth. With respect to F/D ratios, applicant described defined desirable as falling into constant, increasing, or decreasing; and all lenses would inherently fall into one of those categories. Similarly, desirable depths were defined as varying levels or depths. This would broadly be interpreted as any depth, and inherent in any array.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-4, 7, 11-23, 33 and 37-38 are rejected under 35 U.S.C. 102(b) as being anticipated by Alexandru (US-6089096).

Alexandru shows a two-dimensional imaging array having variable focusing abilities in both the aximuthal and elevational directions and an adjustable aperture. In the first paragraph of the BACKGROUND OF THE INVENTION, the type of imagining mentioned is that of backscattering. In column 2, lines 48-56, it is stated that lenses can be combined to enhance the focusing. It can only be assumed that the lenses inherently have a desirable F/D ratio to focus at

desirable depths, verses the alternative of undesirable selection of F/D ratio to focus at undesirable depths. The capability recited in claim 7 of emitting a divergent beam is inherent in any transducer, given its size and the wavelength applied to the transducer element; i.e., every transducer is capable of issuing a divergent beam, depending upon the frequency of the signal applied to it. Although depth-variable elevational and azimuthal focusing by combining electronic beamforming and fixed mechanical lens (or element shaping) is the novelty of the invention, it is clearly a modification and simplification of the known variable electronic 2D arrays mentioned in the background of the invention stated in column 2, lines 20+, where it is stated that "variable elevation focal depth can be achieved by constructing two-dimensional arrays (2D arrays) of small square elements and connection them to independent beamformer channels, thus providing electronic focusing in both the azimuthal and elevational directions. This method, however, requires a number of beamformer channels that is prohibitively expensive." Further, in column 1, lines 30+, it is stated that "(F)ocusing of the beam at a certain point in the medium is achieved by delaying the waves emitted from or received at various points in the aperture", thus anticipating the modulating in at least one of time, frequency, phase, etc., language now recited in claims 19 and 38.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 34, 36 and 41-42 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexandru as applied to claims 1-4, 7, 11, 13-23, 33 and 37-38 above, and further in view of applicant's admissions.

6. Alexandru, in col. 2, lines 49-51, teaches that elevational focusing can be further enhanced with, for example, a lens. Applicant, in Figure 2, admits that elevational focusing can be performed with a concave lens. Such a lens would inherently produce one of a constant, an increasing, and a decreasing F/D ratio, as those choices cover all choices of F/D ratio types. It would have been obvious to use a lens as taught in Alexandru to further enhance focus in the elevational direction, and to make the lens a concave lens as taught by applicant's admitted prior art to do the enhancement in one of the F/D ratios recited by applicant.

7. Claim 8-10, and 27-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexandru as applied to claim s 7 and 18 above, and further in view of Entrekin et al (US 5,305,756).

8. Although Alexandru shows a lens in its Fig. 1 prior art that would appear to cause a divergent beam, it does not specifically teach this. However, Entrekin et al specifically motivates one to issue a divergent beam in the elevational direction by geometry and/or via a lens to insonify a region to be imaged. Thus, it would have been obvious to one of ordinary skill in the art to modify Alexandru to issue divergent beams from its transducer elements to insonify a volume, as taught by Entrekin et al. It would have been further obvious to one of ordinary skill in the art that divergence to insonify could be performed in any other direction via the same technique as in the elevational direction.

9. Claims 25-26 and 39-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Alexandru as applied to claim s 18 and 37 above, and further in view of Smith et al (US-4890268).

10. Although Alexandru teaches some of the effects of transducer elements of differing sizes, a specific teaching of their sizes in terms of acoustic wavelengths could not be found. However, in the transducer array of Smith cited by applicant as a model structure of an array, the operating frequency of 5MHZ cited therein, combined with the dimensions cited for the dimensions of the transducers, indicates that the transducers elements are in the .5 to about 20 acoustic wavelengths of the operating frequency. Thus, it would have been obvious to one of ordinary skill in the art to dimension the transducer elements of Alexandru to fall in the range of .5 to 20 acoustic wavelengths of the operating frequency, as taught by Smith.

11. Applicant's remarks have been read and considered, but are unpersuasive. Applicant's arguments involving backscattering material is unpersuasive, since applicant has not stated how his method steps or device claims are now distinguished over the prior art due to the characteristics of the intended test material. The focusing steps and/or structure appear to be no different than before this limitation was added to the claims. Also, Alexandru clearly teaches the imaging of backscattering material. Similarly, the added limitation of a lens of desirable F/D ratio at desired depths is not persuasive for reasons given in paragraph 9, above. Since all lenses have an F/D ratio, and Alexandru specifically teaches to use a lens to achieve enhancement of the focus over depth, it cannot reasonably be argued that Alexandru would pick an undesirable F/D ratio.

12. Applicant's remarks have been read and considered but are unpersuasive because they ignore the statements of Alexandru mentioned in the background of invention referenced in paragraph 3, above.

Conclusion

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Ishrak et al shows a two-dimensional array for controlling focus in two directions, where the element faces are shaped to enhance focus. The Hasegawa et al references show acoustic lens systems for ultrasonic inspection systems.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John C. Hanley whose telephone number is 571-272-2195. The examiner can normally be reached on M-F 9AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hezron Williams can be reached on 571-272-2208. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

JCH

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